

REMARKS

The examiner rejects claims 19-20 under 35 USC § 103(a) as being unpatentable over Janonis (5,612,580) and claims 1-5, 8-14, 17-18, 21-23, and 25 as being unpatentable over Janonis in view of Tassitino (5,633,539). As argued previously Janonis monitors the amplitude and frequency of the AC input voltage to determine if it meets the quality criteria, and this method of monitoring is fundamentally different from the present application. A novel and unexpected benefit is realized by monitoring and/or sensing DC bus voltage, as compared to the disclosed monitoring and/or sensing of AC voltage in Janonis and Tassitino. In the event of a failure or misoperation of the AC/DC current converting device, such as the disclosed Janonis first converter 32 or the Tassitino rectifier 160, the AC voltages sensed by Janonis and Tassitino would remain unchanged. However, DC voltage would drop to zero volts, or be significantly degraded, in the event of a failure or misoperation of the disclosed Janonis first converter 32 or the Tassitino rectifier 160. That is, because Janonis and Tassitino do not monitor DC voltage, a failure or misoperation of the Janonis first converter 32 or the Tassitino rectifier 160 would not be detected. In the various embodiments as recited in at least claims 1, 10, 19, and/or 21, such a failure or misoperation of the rectifier 18 would be detectable since DC bus voltage is being monitored or sensed. Both Janonis and Tassitino fail to recognize this benefit due to their inability to sense the DC bus voltage.

Measuring the AC input and the DC bus voltage are not considered functionally identical

Pursuant to MPEP 2144.03 the examiner has provided references to support his opinion that common knowledge in the art considers measuring the AC input and the DC bus voltage functionally equivalent for the purposes of constructing an AC/DC rectifier. For the reasons cited above measuring at the DC bus voltage has a distinct utility which is not possible when measuring at the AC input, and as such is patentable subject matter. For the following reasons the examiner's citations do not support his claim that common knowledge in the art considers measuring the AC input and the DC bus voltage to be functionally identical.

The examiner issues Official notice that "the voltage level of the power source can be sensed either as an AC voltage before the AC source converter, or as a DC voltage after the converter." While the examiner is correct that the DC voltage after the converter is dependant on the AC power characteristics, he is not correct in stating, nor do any of the references that he cites to support this claim show, that measuring the DC voltage is *the same as or functionally the same*

as measuring the AC voltage. Following is an examination of the cited portion of each patent used to support the examiners claim.

The examiner first turns to Weinstein (US 5,939,799) which the examiner states “discloses an uninterruptible power supply comprising an AC/DC converter and a voltage threshold detection unit that alternatively detects the AC input or DC output voltage of the AC/DC converter.” Weinstein does disclose measuring either the AC input or the DC output of an AC/DC converter. Due to the functionality of the AC/DC converter the actual values of the voltage measurement do not matter. Instead the Weinstein device checks to see if a voltage decrease has occurred, and interprets the occurrence of one as a failure in a primary voltage source. (Column 3 lines 11-18). Since the Weinstein device does not interpret the values of the voltage measurements and it does not disclose any proportionality between the AC input and the DC input, it merely discloses a correlating effect on the DC voltage when there is an effect on the AC input, it cannot be used to show that AC/DC converters in the general knowledge of the art treat measuring the AC input as identical to, or functionally the same as measuring the DC bus voltage.

The examiner states that “Sakai (US 6,784,641) discloses an uninterruptible power supply comprising an AC/DC converter and a state detection unit that senses both the AC input and DC output.” While this statement in general is true, it is unclear how this statement, or the patent it relies on, support the supposition that measuring the AC input and measuring the DC output would be functionally identical. The presence of a state detection unit that detects both the AC input and the DC output would instead indicate that the two measurements cannot be treated as functionally identical since doing so would result in unnecessary redundant measurements if they were functionally identical.

The Examiner uses Morris (US 4,317,052) to show an example of “an AC/DC converter where the DC output voltage is proportional to the AC input voltage.” The examiner neglects to take into account column 6 lines 17-26. In that section Morris discloses that a typical rectifier will generally have offset voltages associated with them. This offset voltage requires some form of accounting for the offset voltage when converting between AC and DC current. Because of the offset voltages it cannot be said that measuring the AC voltage is the same as or functionally the same as measuring the DC current. Since the presence of the offset voltages changes the DC to AC voltage value relationship from a proportional relationship into a non-directly proportional

relationship, and Morris discloses this offset as a general property of all rectifiers, Morris supports the applicant's argument that measuring the DC voltage bus is not the same as and not functionally the same as measuring the AC input.

The examiner uses Rödel (US 4,109,308) to show an example of a "prior art AC/DC converter with DC outputs that are proportional to AC inputs." While the patent for Rödel is directed toward converting from AC to DC the disclosure does not support the statement that within AC/DC converters in the art it is functionally the same to measure the AC input and the DC output bus. The disclosure, in its detailed description, supports an argument that the specific AC/DC converter being patented has a proportional AC input and DC output (Column 3 lines 36-42), however this does not support a statement that the general art itself assumes proportional AC input and DC outputs, or that measuring one is functionally the same as measuring the other.

Togneri (US 3,942,095) is another patent cited to by the examiner. In its disclosure Togneri discloses 4 systems for AC/DC conversion in the cited portion that purportedly have a proportional AC input and DC output voltage. However, Togneri also indicates that this proportionality cannot be assumed to result in correct measurements as it describes all 4 systems as being inaccurate (Column 1 line 53, and Column 2 line 4). The inaccuracy indicated by Togneri illustrates that it would have been beneficial to measure the DC output voltage because the DC output voltage would not necessarily reflect the input voltage proportionally.

The examiner additionally states that Gadberry (US 3564387) "discloses an AC/DC converter where the DC output voltage is proportional to the AC input voltage." Gadberry utilizes a different mechanism for converting an AC signal into a DC signal. In Gadberry the goal is not to rectify an AC wave, but instead to represent an AC audio signal using DC voltage levels. Due to this purpose the AC to DC converter disclosed in Gadberry is not constructed the same, nor can it be said to operate the same as AC/DC converters in the same general art as the present application.

Finally the examiner turns to Bravenec (US 3,411,066) to support his claim that AC/DC converters may generally interchange measuring at the DC bus with measuring at the AC input. Bravenec is not applicable in this case because Bravenec is designed for the purpose of measuring the AC (RMS) voltage level and does not have a load or other components that would affect the DC voltage and thus reduce or remove its proportionality as would be present with the current invention. Additionally Bravenec only discloses a system where there is a "DC component

proportional to the input AC voltage and a ripple..." Because Bravenec does not disclose a system where the AC voltage is entirely rectified it cannot be said to generally cover the art of AC/DC rectifiers.

The current invention utilizes a measurement at the DC bus load point. This measurement is fundamentally different than a measurement at the AC input would be. Under ideal conditions with no load the DC voltage at the DC bus would always be a function of the AC voltage. The present device does not operate under ideal conditions. The present device may have any number of varying load conditions that could affect the DC bus voltage, while not having any effect on the AC input voltage. The presence of a variable load causes the DC bus voltage to vary not just as a function of the AC input (as would be required for the two measurements to be interchangeable) but also varies as a function of the load characteristics. Additionally measuring at the DC bus voltage has the additional benefit of recognizing a failure of the first converter or rectifier whereas measuring at the AC input would not, as explained above.

For the preceding reasons measuring the AC input and the DC output bus voltages are not considered to be functionally the same in the art and claims 1-5, 8-14, 17-18, 19-23, and 25 are patentable over Janonis and Tassitino and over their combination.

Claims 6-7, 15-16 and 24

With regards to claims 6-7, 15-16, and 24 the examiner rejects them under 35 U.S.C. § 103(a) as being unpatentable over Janonis in view of Tassitino and Faria (US 6,295,215). For the reasons described above claims 1, 10, 19, and 21 are patentable over Janonis in view of Tassitino. Since the combination of Faria with Janonis and Tassitino does not disclose or describe measure the DC voltage at the DC output voltage bus, and the same feature is a requirement of the present claims it cannot be said that Faria combined with Janonis and Tassitino discloses the subject matter of claims 6-7, 15-16, and 24. In light of this, claims 6-7, 15-16, and 24 are patentable over Janonis in view of Tassitino and Faria.

If any fees are ever due, the Commissioner is authorized to charge Deposit Account No. 50-1482, in the name of Carlson, Gaskey & Olds, P.C., for any additional fees or credit the account for any overpayment. Therefore, favorable reconsideration and allowance of this application is respectfully requested.

Respectfully submitted,
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Dated: October 10, 2007